

REMARKS

The Amendment, filed in response to the Office Action mailed September 18, 2008, is believed to fully address all issues raised in the Action. A favorable reconsideration of the application is respectfully requested.

Claims Disposition

Upon entry of the current amendment, which is respectfully requested, claims 1, 2, 4-6, 8, 13-17, 19-22, 24, and 29-31 are all the claims pending in the application. Claim 1 is amended to incorporate the features of claims 3, 7 and 11. Also, amended claim 1 further recites the limitation that the unmodified starch having anion charges of 500 meq (milliequivalent) or more. Such amendment is supported by the original disclosure, for example, the description of [0045] of the original application.

In the current amendment, claim 16 is amended by incorporating the subject matter of claim 18 (a thickness of a biodegradable film), claim 23 (a titanium dioxide in which an anatase content is 70% or more as a photo catalyst), claim 27(sodium benzoate or sodium propionate as a preservative) and the limitation that unmodified starch having anion charges of 500 meq (milliequivalent) or more based on the [0045] of the specification of the application.

Some claims are amended to remove improper dependency.

Claims 3, 7, 9-12, 18, 23, and 25-28 are canceled without prejudice or disclaimer.

No new matter is introduced.

Formal Matters

Applicants thank the Examiner for accepting the drawings filed on May 19, 2006.

Applicants further thank the Examiner for acknowledging claim for foreign priority and receipt of the copies of the certified copies of the priority documents from the IB.

Applicants note that the Examiner did not consider the references listed in May 19, 2006 IDS and SB/08 Form. Applicants will submit copies of the references and English translations in due course.

Response to Provisional Non-statutory Double Patenting Rejection

Claims 1-16 provisionally rejected on the ground of nonstatutory obviousness type double patenting as being unpatentable over claims 1-14 of copending Application No. 11/579,619 in view of Bastioli *et al.* (US 5,512,378).

Applicants respectfully request the rejection be withdrawn, as the instant application has an earlier filing date than the copending Application No. 11/579,619 (November 6, 2006) and the instant application is believed to be in the condition for allowability otherwise.

At least, Applicants respectfully request the rejection be held abeyance until the patentable subject matter is determined.

Response to Rejections under 35 U.S.C. § 103(a)

Claims 1, 2, 4-8, 11, 12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bastioli *et al.* (US 5,512,378) in view of George *et al.* (US 5,393,804) Sanbayashi *et al.* (US 2002/0160910), Matsuda *et al.* (US 6,183,596), and Kraskin *et al.* (US 3,954,104).

On pages 4-8 of the Action, the Office provides a detailed analysis and discussion of the references, which are not repeated.

At pages 8-13 of the Action, claims 3, 16-24, 27, 28, 30 and 31 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Bastioli in view of George *et al.* (US 5,393,804) Sanbayashi *et al.* (US 2002/0160910), Matsuda *et al.* (US 6,183,596) and Kraskin *et al.* (US 3,954,104) as applied to claim 1 above and further in view of Kuroda *et al.* (US 5,786,406).

The detailed discussions and analysis of the references, provided at pages 8-13 of the Action, are not repeated.

Applicants respectfully traverse the rejections as follows.

First, claims 3, 7, 9-12, 18, 23, and 25-28 are canceled and thus the rejections of these claims are rendered moot.

Without conceding or commenting on the merits of the rejection, in order to solely advance the prosecution, claim 1 is amended to incorporate the subject matter of claims 3, 7, and 11, as well as the limitation "the modified starch having anion charges of 500 meq or more.

As claim 3 is not included in the rejection of claims 1, 2, 4-8, 11, 12 and 14 over Bastioli *et al.* (US 5,512,378) in view of George *et al.* (US 5,393,804) Sanbayashi *et al.* (US 2002/0160910), Matsuda *et al.* (US 6,183,596), and Kraskin *et al.* (US 3,954,104), the amendment of claim 1, which incorporates the subject matter of claim 3, renders the rejection moot and, therefore, it is respectfully requested that the rejection be withdrawn.

With respect to the Rejection of claims 3, 16-24, 27, 28, 30 and 31 under 35 U.S.C. § 103(a), Applicants respectfully traverse as follows.

Amended claim 1 of the instant application relates to a biodegradable starch bowl comprising a biodegradable film which has a thickness of 100-300 μ m for water-resistance being attached to an inner surface of the bowl and comprises unmodified starch having anion charges of 500 meq(milliequivalent) or more and pulp fiber powder.

The Office asserts that the biodegradable film which has a thickness of 100-300 μ m being attached to an inner surface of the bowl of the present invention is rejected under 35 U.S.C. § 103(a) as being unpatentable over Bastioli et al. (US 5512378) which discloses biodegradable articles comprising a starch and a biodegradable film thereon.

Bastioli teaches a biodegradable laminated film comprising two layers: (a) a first layer comprising a starch; and (b) a hydrophobic layer adjacent to, and in contact with, the first layer, comprising (i) a wax selected from the group consisting of natural waxes, synthetic waxes and mixtures thereof; and (ii) a synthetic polymer (Referring to Claim 1 of Bastioli).

In this regard, a hydrophobic layer comprising a wax and a synthetic polymer might be considered to apply to the biodegradable film of the present invention being attached to the bowl. However, the hydrophobic layer disclosed in Bastioli has significantly different properties from that of the present invention.

When referring to EXAMPLE 2 of Bastioli, the wax layer coated on starchy film (prepared by the process of EXAMPLE 1 of Bastioli) has thickness of 0.6 microns, and water permeability of 402 g X 30 microns/m² X 24 h at 38°C, 90% humidity. The water permeability is lower than that of starchy film which has no wax coating layer, and it becomes even lower down to 215 g X 30 microns/m² X 24 h when the second layer of wax coating which has thickness of 1.3 microns is added. Notwithstanding this, the water is still permeable even if the film has 2 wax coating layers.

In addition, although EXAMPLE 3 of Bastioli includes further polyethylene-acrylic acid coating layer which has a thickness of 0.6 microns as a synthetic polymer in a film, the water permeability is still 210g X 30 microns/m² X 24 h. The coating layer comprising a derivative of abietic acid (abietic acid with glycerine and phthalic acid, in which the abietic acid constitutes

90% of the product by weight), which is included further onto the wax layer and starchy film, has a thickness of 7 microns and the water permeability is $111\text{g X } 30\text{ microns/m}^2 \text{ X } 24\text{ h}$ as shown in EXAMPLE 4 of Bastioli. Therefore, the maximum thickness of hydrophobic layer applied in Bastioli is 7.6 microns.

To the contrary, the biodegradable starch bowl as defined in claim 1 has a biodegradable film having thickness of $100\text{-}300\mu\text{m}$ for water-resistance, which is significantly different from that of film disclosed in Bastioli in that the film of the present invention is about 15~42 times or more thicker than that of Bastioli. In addition, the biodegradable film having a thickness of $100\text{-}300\mu\text{m}$ is to prevent water- permeating to the starch bowl. Referring to Experiment 3 and Table 12 of the present specification, it is possible to completely prevent the water-leakage when the film having a thickness of $100\text{-}300\mu\text{m}$ is attached to an inner surface of the bowl. That is, a thickness of $100\text{-}300\mu\text{m}$ of the film according to the present invention is for providing water-resistance to the biodegradable starch bowl.

Therefore, Bastioli does not disclose the film having a thickness of $100\text{-}300\mu\text{m}$ which has no water permeability to the biodegradable starch bowl according to the present invention, which is therefore different from that of Bastioli.

Meanwhile, the Office asserts that Kuroda et al.(US 5786408), which discloses a biodegradable molded articles comprising a biodegradable film having a thickness of 5-200 microns, can be applied further to Bastioli.

However, Kuroda only discloses a biodegradable polyester resin composition comprising polycaprolactone to improve the biodegradable property, and a biodegradable article molded from the composition which can be used in agriculture fields, and for wrapping a variety of

commercial products, and does not disclose the film being able to be attached to the inner surface of the biodegradable starch bowl for providing water-resistance.

Even though Kuroda discloses the film having a thickness of 5 to 200 microns (column 13 lines 1-10), there is no motivation to combine the thickness to the starch bowl to have the thickness as defined in amended claim 1 because Kuroda fails to teach the relationship between the thickness and water-resistance.

The biodegradable starch bowl as currently defined in amended claim 1 comprises unmodified starch having anion charges of 500 meq(milliequivalent) or more and pulp fiber powder. Referring to [0045] and [0046] of the present specification, there is a reason to use the pulp fiber powder with the unmodified starch.

There exists a tendency that the unmodified starch lumps together with each other due to the anion charges of 500 meq(milliequivalent) or more of the unmodified starch. Accordingly, the bonding energy between the molecules becomes weak so that overall strength and water-resistance are decreased. When using the fine pulp fiber(pulp fiber powder), an apparent density can be increased. Further, a volume and a tendency to lump together can be decreased. To this end, it is possible to increase the overall strength such as tensile strength and bend resistance.

Meanwhile, the Office asserts that George et al.(US 5393804) can be applied to Bastioli et al.(US 5512378), as George also discloses unmodified starch as disclosed in Bastioli.

However, George does not consider the unmodified starch, an anion natural starch which is not physically and chemically processed. George only discloses "converted" starch, a starch with a much lower average molecular weight than native starch made by the conversion process involving breaking, rearranging and/or recombining the starch chains: for example in the

presence and through the action of acids, alkalies, enzymes, oxidizing agents and/or heat (Referring to column 1 lines 66-68, column 2 lines 19-23).

Accordingly, the application of George to Bastioli is not appropriate in a view that the basic material used in George and Bastioli respectively is different, and George does not disclose the primary constitution of the present invention related with a biodegradable starch bowl comprising unmodified starch having anion charges of 500 meq (millicquivalent) or more.

It is noted that Matsuda teaches a super microfibrillated cellulose for being added to a coating material used particularly for the production of a coated paper and also for being used as a carrier for a dye or pigment for the production of a tinted paper. By using the super microfibrillated cellulose of Matsuda for the production of a coated paper, the improved printability, including the dry-down, ink density and dots-gain might be achieved (column 3 lines 9-27).

However, the starch bowl comprising pulp fiber powder, as defined in the amended claim 1 does not have any colors, the result being that the starch bowl of the present invention is white. Therefore, it does not require any coating materials or carrier. Also, the addition of the pulp fiber powder decreases lump together when the unmodified starch, having a weak bonding energy between the molecules due to its anion charges, and is used as a basic material, not for carrier of coating material comprising starch.

Accordingly, the combination of Bastioli, George and Matsuda does not disclose fully enough to deny the patentability of the present invention, and does not teach all the limitations of amended claim 1.

Kraskin et al.(US 3954104) discloses an applicator for tampons and the like comprising: biodegradable composition comprising hydroxyalkyl cellulose, starch, and an antimycotically-

effective amount of sorbic acid and its alkali metal salts. However, Kraskin excludes the sodium benzoate or sodium propionate as a preservative.

It is noted that the Office asserts that the present invention is unpatentable over Sanbayashi et al.(US 2002/0160910) which is applied further to Bastioli, and the titanium dioxide where the anatase content is 70% or more is obvious to a person skilled in the art to include the anatase to achieve “excellent photochemically catalyst.” However, titanium dioxide in which the anatase content is 70% or more as used in the present invention is different from that disclosed in Sanbayashi in relation to the constitution and the use.

Sanbayashi teaches “titanium dioxide and a condensed phosphate containing an alkaline earth metal which is present on the surface of the titanium dioxide” and the titanium dioxide and a condensed phosphate containing an alkaline earth metal is for “photocatalytic functions, photo-functional properties such as ultraviolet absorbing ability and transparency, and hydrophilicity.”

However, the anatase content being 70% or more means that titanium dioxide comprises an anatase crystal structure by 70% and the remaining 30% consists of a rutile-type titanium dioxide as a major element and a brookite-type titanium dioxide as a very minor element (Referring to [0057] of the present specification). Therefore, the constitution of titanium dioxide where the anatase content is 70% or more is significantly different from that of titanium dioxide and a condensed phosphate containing an alkaline earth metal disclosed in Sanbayashi, and Sanbayashi does not disclose titanium dioxide where the anatase content is 70% or more.

In addition, the titanium dioxide in which the anatase content is 70% or more is used for sterilizing and deodorizing. When referring to COMPARATIVE EXAMPLES 17 to 28 and Table 11 of the present specification, COMPARATIVE EXAMPLES 17 to 28 which used rutile phase TiO₂ as the photo catalyst, do not exhibit the sterilizing and deodorizing effects compared

to the EXAMPLES 1 to 16 which used TiO₂ wherein the anatase content is 70% or more. That is, when the titanium dioxide in which the anatase content is 70% or more is used for sterilizing and deodorizing in an amount of 0.1-2.0 wt%, the sterilizing and deodorizing effects are excellent.

However, Sanbayashi, disclosing “the titanium dioxide and a condensed phosphate containing an alkaline earth metal” for “photocatalytic functions, photo-functional properties such as ultraviolet absorbing ability and transparency, and hydrophilicity,” does not consider the sterilizing and deodorizing effect of biodegradable starch bowl derived from the titanium dioxide in which the anatase content is 70% or more.

It is further noted that the Office asserts that the invention of Claim 13 is unpatentable over Shogren et al.(US 6146573) which is applied further to Bastioli. The mixing ratio is obvious to a person skilled in the art to adjust the concentration of the releasing agent.

However, Shogren does not disclose the mixing ratio of 1:1.5 by weight. Also, according to EXAMPLES 13, 14 and 16 of the present specification, the releasing property is poor when the mixing ratio of monostearyl citrate and magnesium stearate is respectively 4:1(EXAMPLE 13), 2.33:1(EXAMPLE 15) and 1:4(EXAMPLE 16) as opposed to other EXAMPLES having the mixing ratio of 1: 1.5. Further, when magnesium stearate and monostearyl citrate are mixed in a weight ratio of 1.5:1, it can be expected that the cost of the raw material is reduced due to the increase of the foaming rate, and it is possible to improve such a phenomenon to have the paste is stuck on an inner wall of the agitator and to provide a gloss and an excellent releasing property to a surface of molded body(Referring to [0119] of the present specification).

Therefore, the invention of Claim 13 is not taught by Shogren, and not obvious to a person skilled in the art due to exhibiting a significant releasing property when applying the

mixture of monostearyl citrate and magnesium stearate having the mixing ratio of 1:1.5 by weight for the starch bowl.

For the reasons discussed above, Applicants respectfully submit that the rejections are not sustainable and their withdrawal is respectfully requested.

CONCLUSION

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number **202-775-7588**.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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